

Answer on Question #43092 – Math – Statistics and Probability

70% of disk drives made from Comdrive function properly. If we have a collection of 5 disk drives what is the probability that:

- a) At least one disk drive doesn't function?
- b) At least one disk drive is functioning

Solution.

The probability that disk drives made from Comdrive function properly is $p=0.7$.

The probability that disk drives made from Comdrive doesn't function properly is $q=0.3$.

We will use the Bernoulli scheme:

$$P(x = k) = C_n^k p^k (1 - p)^{n-k}$$

- a) The probability that at least one disk drive doesn't function is

$$P(x \geq 1) = P(x = 1) + P(x = 2) + P(x = 3) + P(x = 4) + P(x = 5) = 1 - P(x = 0).$$

The probability that all 5 disk drives are functioning is

$$P(x = 0) = C_5^0 0.3^0 (0.7)^5 = 0,16807$$

So, the probability that at least one disk drive doesn't function is

$$P(x \geq 1) = 1 - P(x = 0) = 1 - 0,16807 = 0,83193.$$

Answer. 0,83193

- b) The probability that at least one disk drive is functioning

$$\text{is } P(x \geq 1) = P(x = 1) + P(x = 2) + P(x = 3) + P(x = 4) + P(x = 5) = 1 - P(x = 0).$$

The probability that all 5 disk drives don't function is

$$P(x = 0) = C_5^0 0.7^0 (0.3)^5 = 0,00243$$

So, the probability that at least one disk drive is functioning is

$$P(x \geq 1) = 1 - P(x = 0) = 1 - 0,00243 = 0,99757.$$

Answer. 0,99757